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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,833	06/23/2005	Hiroyuki Sato	10936-87	2138
<div>24256 7590 09/18/2007 DINSMORE & SHOHL, LLP 1900 CHEMED CENTER 255 EAST FIFTH STREET CINCINNATI, OH 45202</div>				
			EXAMINER LOEWE, ROBERT S	
			ART UNIT 1709	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/540,833

Applicant(s)

SATO ET AL.

Examiner

Robert Loewe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/24/07; 9/15/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, claim 5 recites the limitation “and the number of moles of water so as to amount to 1.00 to 1.09 per mol of a sulfur source” is confusing. This does not agree with the instant specification which states that “the molar ratio of the alkali metal hydroxide to 1 mol of the sulfur source is preferably 1.01 to 1.08 mol” (paragraph 0050 of US2006/0084785 published application, i.e., instant specification). For purposes of further examination, the Examiner will interpret that the molar ratio referred to in instant claim 5 above refers to the molar ratio of the alkali metal hydroxide, and NOT to the molar ratio of water. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 5-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (JP 2000-191785). For convenience, the machine-translated version of this document will be relied upon in this Office Action.

Claim 5: Sato et al. teaches a process for producing a poly(arylene sulfide) by polymerizing a sulfur source and a dihalo-aromatic compound in an organic amide solvent, which comprises the respective steps of: (1) a dehydration step of heating and reacting a mixture containing the organic amide solvent, an alkali metal hydrosulfide and an alkali metal hydroxide in a proportion of 0.95 to 1.05 mol per mol of the alkali metal hydrosulfide (paragraph 0026; Note that Sato et al. teaches that an equimolar amount of alkali-metal hydroxide be used to react with the alkali-metal sulfhydrate; this explicitly teaches a proportion of 1.0 to 1.0 of metal hydroxide to metal hydrosulfide) to discharge at least a part of a distillate containing water from the interior of the system containing the mixture to the exterior of the system (paragraph 0026), (2) a charging step of adding an alkali metal hydroxide and water to the mixture remaining in the system after the dehydration step (paragraph 0057) to control the total number of moles of the alkali metal hydroxide formed with hydrogen sulfide formed upon the dehydration, the number of moles of the alkali metal hydroxide added prior to the dehydration and the number of moles of the alkali metal hydroxide added after the dehydration, and to control the number of moles of

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alkali metal hydroxide to the sulfur source (including the alkali metal hydrosulfide existing in the system after the dehydration) and to 0.5 to 2.0 moles per mol of the charged sulfur source, respectively (paragraph 0057), (3) a first-stage polymerization step of adding a dihalo-aromatic compound to the mixture to subject the sulfur source and the dihalo-aromatic compound to a polymerization reaction at a temperature of 150-350 °C, thereby converting 50-98% of the dihalo-aromatic compound to prepolymer (paragraphs 0030-0032), and (4) a second-stage polymerization step of controlling the amount of water in the reaction system after the first-stage polymerization so as to bring about a state that water exists in a proportion of more than 2.0 mol, but up to 10 mol per mol of the charged sulfur source, and heating the reaction system to 245 to 290 °C, thereby continuing the polymerization reaction (paragraph 0033).

Sato et al. does not explicitly teach that the ratio of alkali-metal hydroxide to charged sulfur source be between 1.00 and 1.09. Sato et al. explicitly teaches an alkali-metal hydroxide to charged sulfur source of 1.4:1 (paragraph 0057). Note that Sato et al. does not teach that this ratio is limited to 1.4:1, but rather this ratio is simply a working example. Nevertheless, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (i.e., does not require undue experimentation). *In re Aller*, 105 USPQ 233. "Discovering an optimum value of a result effective variable involves only routine skill in the art." *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05. Further, a person having ordinary skill in the art would be motivated to employ the alkali-metal hydroxide and charged sulfur source in ratios which meet the limitations of instant claim 5 as such ratios correspond to a roughly equimolar amounts

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of alkali-metal hydroxide and charged sulfur source, which allows for easier workup and better atom economy.

Claim 6: Sato et al. does not explicitly teach that the alkali-metal hydroxides and alkali-metal hydrosulfides are supplied as respective aqueous mixtures. However, at the time of invention, a person having ordinary skill in the art would have been motivated to employ both of these components as aqueous solutions and would have been motivated to do so since, for large-scale industrial reactions, it is often desirable to employ solutions of reactive solids, as opposed to handling the materials in solid form. For example sodium hydroxide, and sodium hydrosulfide are corrosive and reactive materials which are best handled in aqueous form to promote safer handling and simplicity of addition into reaction vessels.

Claim 7: Sato et al. further teaches during the dehydration step, that the reaction mixture is heated to a temperature of 100 to 250 °C (paragraph 0028).

Claims 8 and 9: Sato et al. does not explicitly teach that the ratio of alkali-metal hydroxide to charged sulfur source be between 1.00 and 1.09. Sato et al. explicitly teaches an alkali-metal hydroxide to charged sulfur source of 1.4:1 (paragraph 0057). However, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (i.e., does not require undue experimentation). *In re Aller*, 105 USPQ 233. "Discovering an optimum value of a result effective variable involves only routine skill in the art." *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05. Further, a person having ordinary skill in the art would be motivated to employ the alkali-metal hydroxide and charged sulfur source in ratios which meet the limitations of instant claim 5 as such ratios correspond to a roughly equimolar amounts

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of alkali-metal hydroxide and charged sulfur source, which allows for easier workup and better atom economy.

Claim 10: Sato et al. does not explicitly teach that the prepolymer according to instant claim 5 has a melt viscosity during the first-stage polymerization step of 0.5 to 30 Pa·s.

However, the poly(arylene sulfide) as taught by Sato et al. and Applicant's disclosure are both produced in substantially the same manner, therefore any physical properties achieved by the compositions of Sato and the instant application would be substantially the same. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See also *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established." See MPEP 2112.01

Claim 11: Sato et al. further teaches after the second-stage polymerization step, (5) a separation step of separating the polymer from the reaction mixture containing the polymer, and (6) a washing step of washing the polymer thus separated with an organic solvent (paragraphs 0048 and 0058).

Claim 12: Sato et al. further teaches that the separation is achieved by sieving/filtering (paragraph 0058).

Claim 13: Sato et al. further teaches that the organic solvent used in the washing step is acetone (paragraph 0048).

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Claims 14-16: Sato et al. does not explicitly teach the claim limitations of instant claims 14-16. However, the poly(arylene sulfide) as taught by Sato et al. and Applicant's disclosure are both produced in substantially the same manner, therefore any physical properties achieved by the compositions of Sato and the instant application would be substantially the same. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See also *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established." See MPEP 2112.01

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (JP 2000-191785). For convenience, the machine-translated version of this document will be relied upon in this Office Action.

Sato et al. inherently teaches the same process for preparing a poly(arylene sulfide) as applied to claim 5 above. Sato et al. does not explicitly teach that the poly(arylene sulfide) has a bis(4-chlorophenyl)sulfide content lower than 50 ppm as determined by a gas chromatographic analysis. However, the poly(arylene sulfide) as taught by Sato et al. and Applicant's disclosure are both produced in substantially the same manner, therefore any physical properties achieved by the compositions of Sato and the instant application would be substantially the same. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the

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identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See also *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established." See MPEP 2112.01

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (JP 2000-191785). For convenience, the machine-translated version of this document will be relied upon in this Office Action.

Sato et al. inherently teaches the same process for preparing a poly(arylene sulfide) as applied to claim 5 above. Sato et al. does not explicitly teach that the poly(arylene sulfide) has a ratio (MV2/MV1) of a melt viscosity value (MV2) of the poly(arylene sulfide) after a reaction with aminosilane to a melt viscosity value (MV1) before the reaction exceeding 2.0 as measured at a temperature of 310 °C and a shear rate of 1,216 sec⁻¹. However, the poly(arylene sulfide) as taught by Sato et al. and Applicant's disclosure are both produced in substantially the same manner, therefore any physical properties achieved by the compositions of Sato and the instant application would be substantially the same. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See also *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "Where the claimed and prior art products are identical or substantially

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identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established.” See MPEP 2112.01

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (JP 2000-191785). For convenience, the machine-translated version of this document will be relied upon in this Office Action.

Sato et al. inherently teaches the same process for preparing a poly(arylene sulfide) as applied to claim 5 above. Sato et al. does not explicitly teach a poly(arylene sulfide) having a bis(4-chlorophenyl)sulfide content lower than 50 ppm as determined by a gas chromatographic analysis, and a ratio (MV2/MV1) of a melt viscosity value (MV2) of the poly(arylene sulfide) after a reaction with aminosilane to a melt viscosity value (MV1) before the reaction exceeding 2.0 as measured at a temperature of 310 °C and a shear rate of 1,216 sec⁻¹. Sato et al. also does not explicitly teach a poly(arylene sulfide) having a bis(4-chlorophenyl)sulfide content is at most 30 ppm, the ratio (MV2/MV1) is 2.1 to 3.0, and the yellow index is at most 7. However, the poly(arylene sulfide) as taught by Sato et al. and Applicant's disclosure are both produced in substantially the same manner, therefore any physical properties achieved by the compositions of Sato and the instant application would be substantially the same. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See also *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). “Where the claimed and prior art products are identical or

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substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established." See MPEP 2112.01

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Loewe whose telephone number is (571) 270-3298. The examiner can normally be reached on Monday through Friday from 9:30 AM to 7:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RSL
20-August-2007


MARK EASHOO, PH.D.
SUPERVISORY PATENT EXAMINER

13/Sept/07